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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,829	09/23/2005	Hartmut Mahlkow	2005-295	1743

  

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EXAMINER	
CULBERT, ROBERTS P	

  

ART UNIT	PAPER NUMBER
1792	

  

NOTIFICATION DATE	DELIVERY MODE
02/13/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

INFO@PAULANDPAUL.COM  
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<b>Office Action Summary</b>	<b>Application No.</b> 10/550,829	<b>Applicant(s)</b> MAHLKOW ET AL.	
	<b>Examiner</b> Roberts Culbert	<b>Art Unit</b> 1792	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 January 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/23/08 has been entered.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new grounds of rejection. Gernon et al. (cited in the rejections below) teach pure sulfonic acids are old and well known in the chemical arts.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was

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made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1, 6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 1 546 524 to Shipley, in view of U.S. Patent 6,187,169 to Gernon et al.**

Regarding Claim 1 Shipley teaches a solution bath for etching copper or a copper alloy, said solution having a pH on the order of 4 or less, comprising: a) at least one oxidizing agent selected from the group comprising hydrogen peroxide and peracids and b) at least one substance selected from the group comprising aromatic sulfonic acids and salts of the aromatic sulfonic acids. (Examples 26-28)

Shipley does not expressly teach the sulfonic acid has a sulfate ion concentration that is less than a product of 2 grams/liter and the volume percent of the substance in the bath.

However, sulfonic acids having reduced sulfuric acid are known in the art. See, for example, Gernon et al. (Col. 4, Lines 1-57). It would have been obvious to one of ordinary skill in the art at the time of invention to use high purity sulfonic acid in order to avoid side reactions in the well known manner. The method of Gernon et al provides at least less than 1% acid content and is reasonably assumed to be capable of providing the recited concentration. Applicant has not provided objective evidence establishing that no method was known to those skilled in the art whereby the claimed sulfonic acid having the recited concentration may be synthesized.

Regarding Claim 6, Shipley teach that the concentration of the substances is in the range of from about 5 to about 250 g/l.

Regarding Claim 8, Shipley teach the aromatic part of at least one aromatic sulfonic acid or of at least one salt of the aromatic sulfonic acids comprises at least one phenyl group.

Regarding Claim 9, Shipley teach that at least one phenyl group is substituted by one or more radicals selected from the group comprising nitro, amino, hydroxy, halogen, C<sub>1</sub>-C<sub>5</sub> alkyl radicals and C<sub>1</sub>-C<sub>5</sub> alkoxy radicals.

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Regarding Claim 10, Shipley teach that at least one aromatic sulfonic acid is selected from the group comprising benzene sulfonic acid, phenol sulfonic acid, toluene sulfonic acid, amino benzene sulfonic acid and naphthalene sulfonic acid.

**Claim 1, 6, 8-10 and 12-14, 17 and 19 are rejected under 35 U.S.C. 102(a) as being unpatentable over FR 2 392 100 A. to Goffinet in view of U.S. Patent 6,187,169 to Gernon et al.**

Regarding Claims 1, 6, 8-10, 12-14, 17, and 19, the Goffinet teach a solution for etching copper to improve the adherence of coatings comprising the process and a solution for etching copper. The solution contains 200 g/l H<sub>3</sub>P<sub>04</sub>, 40 g/l H<sub>2</sub>O<sub>2</sub> and 20 g/l of a phenol derivate, which is phenol sulfonic acid according to page 3, line 24 (example 1). Goffinet does not expressly teach the sulfonic acid has a sulfate ion concentration that is less than a product of 2 grams/liter and the volume percent of the substance in the bath.

However, sulfonic acids having reduced sulfuric acid are known in the art. See, for example, Gernon et al. (Col. 4, Lines 1-57). It would have been obvious to one of ordinary skill in the art at the time of invention to use high purity sulfonic acid in the method of Goffinet order to avoid side reactions in the well known manner. The method of Gernon et al provides at least less than 1% acid content and is reasonably assumed to be capable of providing the recited concentration. Applicant has not provided objective evidence establishing that no method was known to those skilled in the art whereby the claimed sulfonic acid having the recited concentration may be synthesized.

**Claims 2-5, 7, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over FR 2 392 100 A to Goffinet in view of U.S. Patent 6,187,169 to Gernon et al. and in further view of U.S. Patent 6,036,758 to Fairweather et al.**

Regarding Claims 2-5, and 7, as applied above, Goffinet teaches the method of the invention substantially as claimed, but does not expressly teach at least one N-heterocyclic

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compound in the range of about 0.1 to about 300 g/l. However, Fairweather et al. teach teaches a solution for etching copper or a copper alloy, said solution having a pH on the order of 4 or less, comprising: at least one oxidizing agent selected from the group comprising hydrogen peroxide and peracids and at least one substance selected from the group comprising aromatic sulfonic acids and salts of the aromatic sulfonic acids, and further comprising at least one N-heterocyclic compound in the range of about 0.1 to about 300 g/l. It would have been obvious to one of ordinary skill in the art at the time of invention to include a corrosion inhibitor as suggested by Fairweather et al.

Regarding Claims 15 and 16, Fairweather et al teach pre-cleaning with acid prior to the step of etching. (Col. 3, Lines 45-51) Although sulfuric acid is not expressly recited for the pre-clean, selection from acids such as sulfuric would have been obvious to one of ordinary skill in the art. Further there is no indication that the step of pre-cleaning is critical to the invention, since no effect is described.

**Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over FR 2 392 100 A to Goffinet in view of U.S. Patent 6,187,169 to Gernon et al. and in further view of EP 1 167585 A2 to Hongo et al.**

Regarding Claim 11, as applied above, Goffinet teaches the method of the invention substantially as claimed, but does not expressly teach at least one adjuvant selected from the group comprising polyethylene glycol, polypropylene glycol and the derivatives thereof. However, Hongo et al. teach that an acid solution for etching copper comprises at least one adjuvant selected from the group comprising polyethylene glycol, polypropylene glycol and the derivatives thereof. It would have been obvious to one of ordinary skill in the art at the time of invention to include least one adjuvant selected from the group comprising polyethylene glycol, polypropylene glycol in order to increase the solution viscosity in the well known manner. (Paragraph 37-41)

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**Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over FR 2 392 100 A to Goffinet. In view of U.S. Patent 6,187,169 to Gernon et al.**

Regarding Claim 18, Goffinet in view of Gernon et al. do not expressly teach that the metal is electroless nickel-gold or chemical tin. However, Official Notice is taken by the examiner that nickel-gold and tin are well known for coating a copper layer in the circuit forming arts. Further, there is no indication that the material is a critical feature of the invention.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571)272-1433. The examiner can normally be reached on Monday-Friday (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



R. Culbert  
Examiner  
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